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28 JUL 1928

The
Florida Entomologist

Official Organ of the Florida Entomological Society

Vol. XII | SUMMER NUMBER JUNE, 1928 | No. 2

TELENOMOUS MEGACEPHALUS ASHM., AN EGG PARASITE OF THE GREEN PUMPKIN BUG, *NEZARA VIRIDULA* LINN., IN FLORIDA

RALPH L. MILLER*

During the years 1926 and 1927 the writer found that the eggs of the common Pentatomidae, at Lake Alfred, Florida, were being attacked by an egg parasite, *Telenomous megacephalus* Ashm. The species, *Nezara viridula* Linn. and *Euschistus servus* Say, were quite common in citrus groves in Polk County and occasionally did severe damage to trees and ripening fruit. The insects feed on the leguminous cover crops until they are cut or mature, then attack the fruit on the trees. During the autumn of 1926 the insects were especially abundant and troublesome and it was at this time that eggs were found very abundantly parasitized. The writer is indebted to Dr. A. B. Gahan for the identification of the parasite as well as for his assistance in securing records of its occurrence. Dr. Gahan states, "Apparently the only reference to *Telenomous megacephalus* Ashm. in literature is the original description (Jour. Linn. Soc. Lond. Zoology Vol. 25, 1894, p. 208). This species was described from the Island of St. Vincent but is a very common parasite in the eggs of *Nezara viridula* in Florida as well as some of the West Indian Islands. I do not know what the host was in your rearing but in all probability the species is not confined to the above named hemipteron as a host."

Historical.—In a paper in 1920 Dr. C. J. Drake (Quar. Bull. State Plant Board of Florida Vol. IV No. 3 pp. 41 to 93) gives a very complete record of the life history and natural enemies of *Nezara viridula* and in it reports that an occasional egg parasite was found but not enough material was available for complete

*Contribution from the Department of Entomology, Florida Agricultural Experiment Station.

identification. The parasites he secured were placed by Mr. A. B. Gahan in the genus *Ooencyrtus,* family *Encyrtidae.* Another group which were all males belonged to the *Chalcidoid,* subfamily *Eupelminae.*

Collection of Eggs and Parasites.—Eggs of the *Pentatomidae* are usually deposited in large clusters on stems and leaves of growing plants. In this case *Crotalaria striata* and beggar weed *(Desmodium purpureum)* were the two plants most commonly observed and collections from these were frequently made. Since these plants were quite tall it was very easy to crawl along on the ground in the patch and find the clusters of eggs on the underside of the leaves especially when the sun was shining and caused the eggs to form a dark spot on the leaf. All the masses of hatched and unhatched eggs and egg shells were collected and those that were hatched were recorded while those unhatched were reared out in cotton-stoppered test tubes in the insectary.

As Dr. Drake explains, it is quite easy to tell the difference between an egg shell from which a nymph has hatched and one from which an adult parasite has emerged. The shell from which a bug nymph has hatched has a round hole and shows the black, three pointed egg burster very clearly, while a parasitized egg shell is gray in color and has a small, irregular hole on one side of the top surface.

The table on opposite page is a record of the egg masses of *Nezara viridula* collected.

The eggs of three species of Pentatomidae were found to be parasitized, *Nezara viridula, Euschistus servus* Say. and *Euthyrynchus floridanus* Linn. The first is by far the most common but the others are occasionally attacked. The first two, *Nezara viridula* and *Euschistus servus* Say., are plant feeding forms but *Euthyrynchus floridanus* Linn. is entirely predaceous. Eggs of these three species were identified in the field by the general shape and number of spines present on the circle around their tops.

Life History and Habits of the Parasite.—During the month of November, 1927, several egg masses of the three Pentatomidae were deposited in captivity. One of those from *Euthyrynchus floridanus* was chosen immediately after being deposited and was subjected to an adult egg parasite. The tiny, black female wasp walked about over the mass, vibrated her antennae very actively, touching the tops of the eggs as she passed. After about

No.	Egg in Mass	Date Collected	No. of Eggs Hatched	No. of Parasites Emerged	Eggs Unhatched and Unparasitized
1	57	10/15/26	0	50	7
2	79	10/15/26	27	52	0
3	95	11/16/26	94	0	1
4	114	11/16/26	22	92	0
5	45	11/16/26	0	45	0
6	103	11/16/26	0	103	0
7	140	11/16/26	0	140	0
8	111	11/16/26	0	111	0
9	89	11/16/26	60	29	0
10	81	11/16/26	0	81	0
11	70	11/16/26	0	70	0
12	126	11/16/26	0	126	0
13	97	11/16/26	97	0	0
14	77	11/16/26	0	2	75
15	16	11/16/26	0	16	0
16	90	11/16/26	0	90	0
17	128	11/16/26	0	31	97
18	97	11/16/26	18	4	75
19	24	11/20/26	24	0	0
20	111	11/23/26	0	111	0
21	78	11/23/26	0	78	0
22	91	11/23/26	0	91	0
23	28	11/23/26	8	20	0
24	96	11/23/26	0	96	0
25	101	12/8/26	0	101	0
26	87	12/8/26	0	87	0
27	88	12/8/26	0	88	0
28	43	12/8/26	0	43	0
29	120	12/8/26	0	8	112
30	26	3/15/27	25	0	1
31	41	3/15/27	15	26	0
32	39	3/25/27	0	39	0
33	29	3/25/27	28	0	1
34	51	4/20/27	29	22	0
35	43	5/15/27	0	43	0
Total ..	2711		447 (16.4%)	1895 (70.0%)	369(13.6%)

two minutes the parasite was found near the edge of the egg mass pushing her abdomen down over the edge of an egg. The tip of her ovipositor was now brought to touch the side of the egg and then by means of a quick jab, the tip of the ovipositor was thrust into the side of the egg about 1/3 the way down from the top. The wasp now remained very quiet with the antennae folded down on the head very similar in appearance to a man holding his hands over his eyes. The process of depositing the egg required from two to four minutes and after the first egg had been deposited the parasite moved on to the next and repeated the process. This continued until the entire mass of eggs had been parasitized.

The attack on the eggs was begun at 3 P. M., Nov. 18 and on December 12 at 8 A. M. the first adult parasite appeared from

the mass. A tiny irregular hole near one side of the top of the egg was formed and from this came the parasite. By noon on the same day all the parasites had emerged from the egg mass. The entire life history of the parasite consumed 23 days.

Immediately after emergence the parasites were quite active, mating began in a very short time and the process of copulation occupied only a few seconds. The life of the adults was quite short in captivity and they were not observed to feed. In test tubes they very rarely lived more than one or two days.

Economic Importance.—It is very evident that a parasite that is so active and destroys as many eggs of the Pentatomidae as *Telenomous megacephalus* is very beneficial and should aid very greatly in the control of these insects. As is the case with every parasitic insect, if too thorough a control is effected the parasite itself is headed toward extinction because of lack of food material. For this reason one can expect that the peaks of abundance of the Pentatomidae and its egg parasite in this section will occur in cycles with the parasites always a little in the rear. Even though this is the case the peaks of abundance of the destructive bugs will not reach the height they would if the parasite were not present.

NOTES ON THE CYPRESS SPHINX *(Isoparce cupressi)*

By MARSTON BATES

Sphinx cupressi Boisduval, Spec. Gen. Lep. Het. i. p. 102, n. 41, t. 2, f. 3, 4, 5 (1879).
Edwards, Can. Ent., XIX, p. 146 (1887).
Palm, Journ. N. Y. Ent. Soc. I, pl. I, f. 6, p. 20 (1893).
Isoparce cupressi Rothschild and Jordan, Rev. Sphingidae, p. 110 (1903).
Holland, Moth Book, p. 48, fig. 23 (1903).
Grossbeck, Bull. Am. Mus. Nat. Hist., XXXVII, p. 38.
Dukes, Bull. Brook. Ent. Soc., XVII, no. 4 (1922).

Larva: Head rounded, green, with two elliptical black lines converging dorsally; around these lines is a yellowish area, bordered laterally by a pair of lighter lines. First thoracic segment green, with four small longitudinal yellowish-white lines on the dorsum, between which is a variable amount of shining black; laterally with a diagonal yellowish-white line extending in the opposite direction to the white patches on the other segments. Rest of body green, reddish brown dorsally, with the usual oblique lateral stripes interrupted between the segments to form two rows of white patches, converging posteriorly. Thoracic legs

light brown; stigmata brown, surrounded by a spot of reddish-brown, under which there is a small yellowish-white spot. Body covered irregularly with small white dots: greenish on the sides and reddish dorsally. Prolegs light brown, as thoracic legs, with a dark lateral spot. Horn reddish-brown, stiff, finely granulose, directed posteriorly.

Length: 65 mm.; width of head, 5 mm.; length of caudal horn, 8 mm.

Hab.: About a dozen specimens, collected by Mr. T. H. Hubbell and Mr. F. W. Walker in a cypress swamp near Waldo, Florida, in September, 1924. The larvae were found feeding at night on the young trees. The moths emerged as follows: female, Feb. 16; female, Mar. 9; female, Mar. 14; male, Apr. 11; male, May 6.

Pupa: Color chestnut brown, body surface smooth, polished ventrad. Head and dorsum of thorax finely striate. Dorsal surface of abdomen punctate, sculpturing shallow or lacking ventrad. Maxillae oppressed closely to body; extending almost as far caudad as the wings. Antennae and mesothoracic legs extending the same distance caudad. Cremaster triangular, heavily sculptured with irregular ridges. Two well defined spiracular furrows present: a deep anterior one and a shallow posterior one, on segments 5-7.

The pupa runs down to the genus *Ceratomia* on Miss Mosher's key (Ann. Ent. Soc. Am., XI, p. 408). Lacking specimens of *Ceratomia,* I can find no good characters to separate the two. Mr. Dukes (l. c.) has found the pupae in crevices in the trunk of the cypress trees "just above the water-line."

Distribution in Florida: I have found this moth, so rare in collections, at Waldo, Orlando, Gainesville and Fort Lauderdale. It has also been recorded from Kissimmee and Enterprise (Edwards, l. c.) and from Enterprise by Grossbeck, l. c. It is probably state-wide in its distribution, occurring everywhere with the bald cypress *(Taxodium distichum).* In the small number of larvae that have come into my hands, I have found three parasites, a Chalcid, a Sarcophagid and an Ichneumon. The Chalcid is a new species, and the other two have not been determined. These parasites may account for its rarity.

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FLORIDA ENTOMOLOGIST

Official Organ of The Florida Entomological Society, Gainesville, Florida.

J. R. WATSON.....*Editor*
WILMON NEWELL.....*Associate Editor*
A. N. TISSOT.....*Business Manager*

Issued once every three months. Free to all members of the Society.

Subscription price to non-members is $1.00 per year in advance; 35 cents per copy.

THE SCARABAEIDAE OF FLORIDA

By W. S. BLATCHLEY
Dunedin, Florida

(Continued from page 14)

31. (13127). **A. ruricola** Melsh.

Length 4.5-5 mm. Piceous-black, strongly shining, sides and tip of elytra usually paler; front of head in this species, 32 and 33, tuberculate; mesosternum not carinate between the coxae; joint 1 of hind tarsi but slightly longer than 2 and 3 united.

Fort Capron (Sz.); Lake Worth (Ham.); Jacksonville, Nov. 5 (Dav.).

*32. (13134). **A. lividus** (Oliv.).

Length 4.5-5 mm. Dull yellow, shining; hind portion of head, disk of thorax and sutural line of elytra brownish; mesosternum carinate; thorax in this and No. 33 without a basal marginal line.

Schwarz in 1878 recorded *lividus* only from Ft. Capron and as "very rare." It is an introduced species and is now the most common *Aphodius* in the State, occurring everywhere that cattle are found. The records at hand extend from Pensacola and Pablo Beach to Chokoloskee and Royal Palm Park and cover all seasons of the year.

*33. (13135). **A. vestiarius** Horn, 1870, 121.

Length 4-4.2 mm. Piceous-brown, shining; margins of head and thorax and suture of elytra reddish-brown; mesosternum carinate; joint 1 of hind tarsi barely as long as next two.

Originally described from St. Augustine. Haw Creek (Sz. Ms.); Lake Worth (Sloss.); Enterprise (Dietz); Pablo Beach, La Belle and Chokoloskee (Dav.). Sanford, Dunedin, St. Petersburg, Sarasota, Ft. Myers and R. P. Park (Bl.). Common in cow dung throughout the year.

34. (13147). **A. lutulentus** Hald.

Length 5.5-7 mm. Black, subopaque; angles of clypeal notch prominent, subdentate. Elytral intervals flat, strigose-punctate; mesosternum not carinate. Male with spur of front tibiae equalling the first four tarsal joints. Apex of hind tibiae in this and all remaining species of the genus fimbriate with *unequal* spinules.

Tallahassee (Sz. Ms.). No other Florida record.

35. (13149). **A. lentus** Horn.

Length 3.5-4 mm. Reddish-brown, feebly shining; head and thorax slightly darker; mesosternum carinate between the coxae.

Pensacola, Dec. 14, (Sz. Ms. and Schf.).

*36. (13159). **A. rubeolus** Beauv.

Length 3.5-5 mm. Uniform pale reddish-brown, shining; thorax without basal marginal line; mesosternum carinate. Fore femora in this and the next two species punctate in front; first joint of hind tarsi not as long as the next three.

"Common" (Sz.); Enterprise (Dietz); LaGrange, Sept. 10 (Dav.); St. Augustine and Centerville (Sz. Ms). Dunedin, March 7, at carrion; June 10, at light (Bl.).

*37. (13161). **A. campestris** Blatch., 1912, 330.

Length 3-3.2 mm. Head and thorax pale chestnut-brown; elytra pale brownish-yellow, their intervals smooth; clypeus smooth; thorax with basal marginal line; first joint of hind tarsi as long as the next three.

Described from Sarasota. Frequent at Dunedin, Dec. 14-April 23, in cow dung and at light. LaGrange, Sept. 11, "in cabbage palm" (Dav.).

38. (13162). **A. stercorosus** Melsh.

Length 3.5-4.5 mm. Brownish-yellow, shining, head and thorax slightly darker; elytra often clouded with fuscous; clypeus distinctly punctate; thorax without basal line; first joint of hind tarsi longer than the next three.

Suwanee Springs (Sloss.); Enterprise (Dietz); Lake Worth (Ham.).

39. (13163). **A. troglodytes** Hubbard, 1894, 312.

Length 3-3.8 mm. Honey-yellow or reddish yellow; sides of thorax finely punctate, without coarse punctures intermixed; elytral intervals finely punctate; first joint of hind tarsi longer than the next three.

Described from Crescent City, where it occurred in numbers in the burrows of the gopher tortoise. Enterprise (C. & L.); Lake Mary (Fall); Lake Worth (Ham.). Known only from gopher burrows in Florida.

*40. (13164). **A. concavus** Say.

Length 8-8.5 mm. Pale reddish-brown, shining; cheeks rather prominent; disk of thorax of male smooth at middle, finely and irregularly punc-

tured on sides; mesosternum not carinate in this and the next three species; fore tibiae smooth in front.

Crescent City, (Sz. Ms.); Gainesville, Jan. 6, under leaves (Agr. Coll.); Lake Lucy and St. Petersburg (Schf.); Sanford, June 13 (Bl.). The largest species in the State.

41. (13176). **A. parcus** Horn, 1887, 42.

Length 3 mm. Pale yellowish-testaceous, shining; clypeus not denticulate at sides of notch; thorax with distinct but fine basal line and margins conspicuously fimbriate.

Types from eastern Florida. No definite station records.

42. (13177). **A. ægrotus** Horn.

Length 3-4.5 mm. Pale chestnut-brown, shining, elytra sometimes paler; form robust; cheeks narrowed from eye forwards; thorax wholly smooth and with distinct basal line.

"Occurs in Florida and North Carolina" (Horn, 1887, 43). No other record.

*43. (13180). **A. bicolor** Say.

Length 4.5-6 mm. Head and thorax black, elytra piceous-black, the alternate intervals often with small faint reddish spots; under surface and legs pale brownish-yellow; clypeus widely and shallowly emarginate, angulate each side of notch; head and thorax evenly, finely and closely punctate.

Dunedin, March 18 (Bl. 1919, 31). The only record for the State.

Genus X. EUPARIA Serville

Robust subcylindrical pubescent species having the eyes hidden in repose; cheeks large, subacute, separated from the clypeus by a deep notch; thorax short, broader at base than elytra, sides flattened and ciliate; scutellum narrow, acute; middle and hind tibiae curved, the latter with outer apical angle prolonged as in *Ataenius*.

*44. (13211). **E. castanea** Serv.

Length 5 mm. Dark chestnut-brown, shining; thorax one-half wider than long, rather sparsely punctate, each puncture, as well as those of elytral intervals, with a short, erect yellowish hair.

"Fernandina, one specimen among ants" (Sz.). Sanford, Jan. 16, 1911, three taken from the nest of a small brown ant, beneath the bark of a rotten oak stump (Bl.). These are the only records for the State. A myrmecophilous species known elsewhere only from Alabama and Louisiana.

Genus XI. ATÆNIUS Harold

A large genus of small subcylindrical or oblong Aphodiinae, having the mandibles and usually the eyes concealed; sides of

thorax fimbriate; intervals of elytra usually distinctly convex or carinate, their sides often crenate; pygidium partly exposed; mesosternum usually carinate; hind tibiae straight, their outer apical angle prolonged, often spiniform, and in some species with a small "accessory spinule" on the under side near the spurs; first joint of front tarsi always longer than second.

45. (13212). **A. insculptus** Horn, 1887, 70.

Length 4-4.5 mm. Black, subopaque; clypeus in this and the next two species broadly, feebly emarginate with an acute denticle each side of notch; hind femora in this and No. 46 with a deep, entire marginal line; first joint of hind tarsi nearly twice the length of the long spur. Hind tibiae in this and species 46-53, inclusive, *without* accessory spinule.

Described from "Florida." Tampa (Sz. Ms.; Fall). No other records.

*46. (13213). **A. cylindrus** Horn, 1871, 289.

Length 3.5-4 mm. Piceous or black, moderately shining, legs reddish-brown; thorax densely punctured throughout; elytral intervals subacutely carinate; first joint of hind tarsi in this and No. 47 not longer than the long spur.

Types in part from "Florida." Many records from the northern part of the State south to Ft. Myers and Palmdale. Occurs in winter beneath cover along the margins of ponds and in cow dung.

47. (13216). **A. abditus** (Hald.)

Length 3.5-4 mm. Piceous, shining, legs pale reddish-brown; thorax densely punctured throughout; elytral striae coarsely crenately punctate, intervals nearly flat; hind femore without marginal line.

"Fort Capron, Haulover and Enterprise, not rare" (Sz.). No other Florida records.

*48. (13220). **A. imbricatus** (Melsh.).

Length 3.5-4 mm. Piceous, opaque, usually covered with a brownish-gray coating; clypeus, as in all remaining species, feebly emarginate, the angles each side of notch broadly rounded, never dentate; thorax in this and No. 49 without basal marginal line; elytral intervals feebly convex, their punctures each bearing a small scale-like yellowish hair.

"Common" (Sz.). This statement is not borne out by the few definite station records as follows: Gainesville, abundant at lights, June 7 (Doz.). St. Petersburg (Fall). Dunedin, March 20-April 7, scarce (Bl.).

*49. (13221). **A. alternatus** (Melsh.).

Length 4-4.5 mm. Piceous-black, opaque; alternate elytral intervals 1-3-5-7 acutely elevated, cariniform. Otherwise resembles *imbricatus* but averaging larger.

Frequent in northern portion of State, south to Sarasota, Okeechobee and Ft. Myers. Common at Dunedin, February-April, beneath weed debris near water; at light, June 5.

50. (———). **Asosolitarius** Blatch., Can. Ent., LX, 1928, 69.

Length 5 mm. Dark chestnut-brown, antennae slightly paler; thorax with basal marginal line; elytral striae deep, intervals convex, strongly crenately punctate on their inner side. Female with occiput finely, closely punctate; clypeus finely rugose, impunctate; front tibiae tridentate, externally crenate above the teeth; ventrals coarsely, not densely punctate, their front margin finely crenate.

Royal Palm Park, April 2, 1927; one female sifted from weed debris on margin of ditch.

51. (13224). **A. wenzeli** Horn, 1887, 77.

Length 4.5 mm. Piceous-black, shining; head in this and the next two species simply punctate, not rugulose; elytral intervals very flat, minutely alutaceous, their inner sides deeply crenate; abdomen nearly smooth at middle.

Described from New Jersey and Florida. Haulover (Sz. Ms.).

52. (13225). **A. ovatulus** Horn.

Length 3.5 mm. Piceous-black, shining; form rather robust; elytra conjointly oblong-oval, their base slightly emarginate, intervals convex; abdomen coarsely punctured; hind femora with entire marginal line.

Enterprise, very rare (Sz.); St. Augustine (Ham.); Lakeland and Punta Gorda, November (Dav.).

*53. (13226). **A. gracilis** (Melsh.).

Length 3-4 mm. Piceous-black, feebly shining; form slender; elytra elongate, sides parallel, intervals narrow, convex, carina-like; hind femora without marginal line.

Common throughout the State; many records. Occurs in winter beneath boards and weed debris near water; also in dry cow dung.

*54. (13231). **A. strigatus** (Say).

Length 4.5-5 mm. Piceous-black, shining; clypeus finely punctured without trace of rugae, occiput with coarse punctures; elytra deeply striate, striae punctured; intervals convex, crenate both sides; hind femora in this and No. 55 with a deep marginal groove; hind tibiae in this and all following species *with* accessory spinule.

Jacksonville (C. & L.); Biscayne Bay and Orange Co. (Sz. Ms.); Lake Worth (Ham.); Everglade, May (Dav.); Dunedin, April 5, in cow dung (Bl.).

*55. (13232). **A. stercorator** (Fabr.).

Length 5-5 mm. Very similar to *strigatus*, but with sides of clypeus coarsely transversely rugose; coarse punctures of thorax confined to basal third.

"Florida" (Horn); Enterprise (Sz. Ms.); Punta Gorda, Nov.

14 (Dav.); Pensacola and Paradise Key (Fall); Dunedin, June 20-July 10, at porch light (Bl.).

*56. (13233). **A. cognatus** (Lec.).

Length 4.5-5 mm. Black, shining; clypeus more or less wrinkled and coarsely punctured; thorax with scattered coarse punctures mixed with very fine ones over entire surface; elytral intervals coarsely crenate on inner side; hind femora without marginal line.

Occurs throughout the State. At hand from seven different stations and recorded from Jacksonville to Everglade and Royal Palm Park. Found by hundreds at the Park beneath piles of decaying *Chara* and weed debris along ditches.

Genus XII. PSAMMOBIUS Heer

Small oblong species with the general facies of *Ataenius* but having the maxilla corneous and ending in stout curved spines or hooks; front of head coarsely granulated; thorax with margins fimbriate with fine slender hairs, its sides not grooved but with a depression near front angles; first joint of hind tarsi elongate-triangular, last very short.

*57. (13240). **P. cruentus** Harold.

Length 3.5 mm. Piceous, shining; clypeus with a small reflexed tooth each side of the broad emargination; thorax with depression near front angles, smooth on sides and near apex, elsewhere sparsely, coarsely punctate.

Capron, New Smryna, Cedar Keys and Tampa (Sz.); Pensacola and Dunedin (Fall); Lake Okeechobee (Bl.). Occurs beneath cover on sand beaches. The *P. bidens* Horn is a synonym.

58. (13241). **P. schwarzi** Linell, 1895, 721.

Length 3.6 mm. Reddish-brown, shining; clypeus without teeth; thorax with 8-15 coarse punctures on sides and depression near front angle.

Described from Jacksonville. Orlando (Fall).

Genus XIII. RHYSSEMUS Mulsant

Small oblong *Aphodiinae* having the maxillae membranous; head granulate; thorax with transverse grooves entire and with scale-like clavate marginal hairs; hind tarsi with cylindrical joints, the basal one elongate.

59. (13251). **R. scaber** Hald.

Length 3.5-4 mm. Piceous, opaque, antennae pale; clypeus rounded each side of notch; thorax densely granulate and with transverse rows of larger, more shining tubercles.

Lake Mary (Fall). "Occurs at the margins of streams from the middle states to Texas" (Horn). The Florida record of

Rhyssemus californicus Horn (No. 13252 of the Leng Catalogue) probably refers to this species, as no definite station record can be found.

Genus XIV. PLEUROPHORUS Mulsant

Very small, subcylindrical species, allied to *Psammobius* but thorax with margins not fimbriate, the disk with one or two deep grooves each side and punctures very coarse and scattered.

*60. (13256). **P. parvulus** Chev.

Length 2-2.5 mm. Reddish-brown, head and thorax in part darker; clypeus densely granulate, without tooth each side of notch; thorax roughly sculptured, a deep groove each side at apical third, punctures very coarse.

Dunedin, March 19, one specimen swept from low herbage near bay front (Bl.). St. Petersburg, April 26 (Fall). This is the *P. nanus* of Horn. It is the smallest known species of North American Scarabæidae.

Subfamily OCHODÆINAE

Oval, convex brown species thickly clothed above with short erect hairs; antennae 10-jointed; clypeus not dilated, not covering mandibles and labrum; elytra striate; front coxae prominent; ventral segments six, not connate.

Genus XV. OCHODÆUS Serville

This, the only genus of the subfamily, is sufficiently characterized above.

61. (13273). **O. frontalis** Lec.

Length 5-6.5 mm. Pale reddish-brown, thickly pubescent with coarse yellow hairs. Clypeus hemi-hexagonal with an acute tubercle near the frontal suture; all femora of male with tooth near tip, hind ones with another near apical third and front ones with tooth at middle.

"Occurs from Texas to Florida" (Horn); Enterprise (Sz.); Miami, Sept. 22 (Dav.).

Subfamily GEOTRUPINAE

Oval or rounded convex beetles of variable size having the antennae 11-jointed, club 3-jointed; elytra usually strongly striate, covering the pygidium; front coxae prominent, middle ones oblique, usually contiguous; ventral segments six. They either live in excrement or wander about in search of other food.

KEY TO TRIBES OF FLORIDA GEOTRUPINAE

a. Club of antennae lenticular, i. e., large, round, convex on both sides; color brown or piceous. Genera XVI-XIX. Tribe BOLBOCERINI.

aa. Club of antennae smaller, lamellate, i. e., formed of leaf-like plates; color black, bluish or metallic green. Genus XX. Tribe GEOTRUPINI.

Genus XVI. BOLBOCERAS Kirby

Large or medium sized species having the eyes only partially divided by a process from the side of head. Includes *Bradycinetus* Horn.

*62. (13282). **B. ferrugineus** (Beauv.).

Length 17-21 mm. Dark to pale reddish-brown, feebly shining; sides of thorax broadly rounded from base to apex, not serrate. Male with clypeus flat, truncate in front; thorax with a transverse premedian ridge ending each side in an obtuse tubercle; clypeus of female with a curved transverse ridge and behind this a median obtuse tubercle.

Enterprise (Sz. & Dietz); Crescent City and St. Augustine (Sz. Ms.); LaGrange, Sept. 11 (Dav.); Gainesville, rather scarce at light, June-Aug. (Doz.). Dunedin, June 4, one at light; March 28, one ploughed up from sandy soil near border of pond. Apparently scarce and not definitely recorded except from Florida.

Genus XVII. ODONTÆUS Klug

Rather small species having the eyes wholly divided by a flattened process from side of head; process between the middle coxae without a vertical, tooth-like elevation.

63. (13285). **O. corniger** (Melsh.).

Length 9.5-10 mm. Reddish-brown. Head of male with a long, rather stout fixed horn, the thorax, as in the next, with two wide, deep pits with a stout curved spine in front of each.

Enterprise (Dietz.); Slosson collection (Leng Ms.).

*64. (13286). **O. filicornis** (Say.).

Length 6-8-5 mm. Pale to dark reddish-brown. Male with horn more slender and movable; thorax with a sharp ridge each side of the pits. Female without horns, or pits on thorax, the latter coarsely irregularly punctate.

Enterprise (Sz.); Tampa (Sz. Ms.); Dunedin, two males, March 15-25, at porch light (Bl.).

Genus XVIII. BOLBOCEROSOMA Schæffer

Medium sized species allied to *Bolboceras* but having the eyes completely divided; middle coxae narrowly separated and with a tooth-like elevation arising from the process between them. Male with a short horn at middle of clypeus; female with horn reduced to a transverse ridge.

*65. (13288). **B. farctum** (Fabr.).

Length 8-12 mm. Brick-red, the head, narrow basal cross-bar on thorax and suture, side margins and apical third of elytra, black. Elytra in typical

form with second and fifth striae absent; in var. *tumefactum* Beauv. with seven entire striae.

Gainesville; one, July 30, flying over grass of wet prairie; one, Aug. 3, beneath loose bark of pine (Doz.).

Genus XIX. EUCANTHUS Westwood

Small chestnut-brown species, having the eyes only partially divided; middle coxae contiguous. Male with a short flattened curved truncate or bifid horn on clypeus, a transverse ridge on vertex and a similar ridge with a tubercle each side on thorax. Female with clypeal horn of male replaced by a ridge and the transverse ridge of vertex more prominent.

*66. (13289). **E. lazarus** (Fabr.).

Length 6-12 mm. Chestnut-brown, shining. Other characters as above given.

Frequent at light, June-September, in northern part of State, the records being: Haulover, Enterprise and Cedar Keys (Sz.); St. Augustine (Ham.); Central City and Orange County (Sz. Ms.); Ortega, Sept. 27 (Dav.); Gainesville, Sept 16, on goldenrod; Lake City, March 12 (Ag. Coll.). In the south taken only at St. Petersburg, Jan. 20, on wing; Dunedin, April 3 and July 7 at light (Bl.).

(To be continued)

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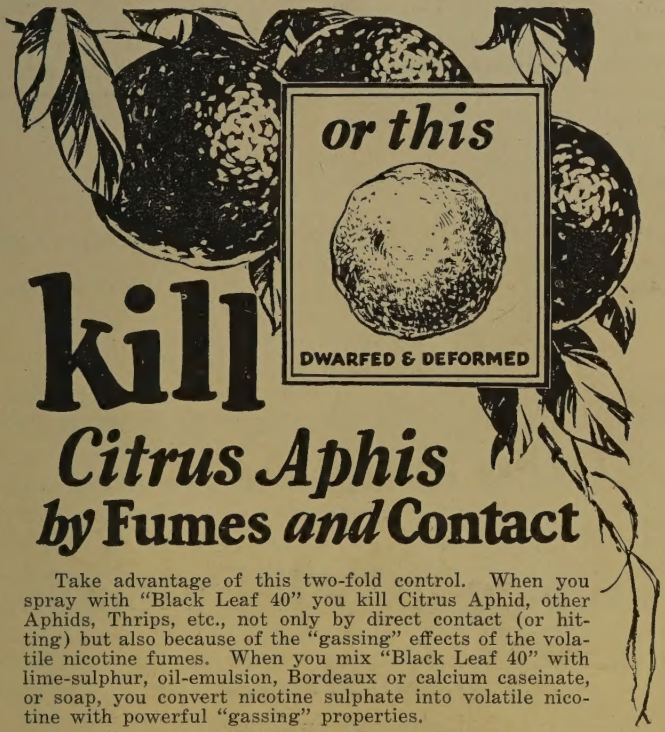

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